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ART. I.—*Rearing Silk-Worms.* Communicated by Hon. H. A. S. DEARBORN.

As the culture of silk, excites universal attention, throughout the United States, every kind of information, in relation to that subject, cannot fail of being highly interesting to those, who have already commenced, or contemplate entering into that important branch of husbandry; and having recently read a most able and instructive report, made to the Society for the Encouragement of National Industry, in France, on a novel mode of rearing silk-worms, in apartments artificially warmed and ventilated, I have translated it for publication. The intelligence it contains, may, possibly, be employed to great advantage, in the New England and Middle States, where the climate is much more rigorous, than in the northern departments of France, for the benefit of which the experiments were suggested, and prosecuted; and with so much success, that it is now considered practicable, to extend the cultivation of one of the most valuable products of the south, over the whole of that empire.

Although it has been conclusively shown, that the mulberry and silk-worm can be profitably reared in all parts of this country, still it is worthy of consideration, whether more satisfactory results cannot be obtained, by adopting the system which has been practically illustrated near Paris, to obviate the deleterious influence of cold, humidity, noxious exhalations, and the sudden changes of weather upon that delicate insect.

This is, emphatically, an age of invention, enterprise and advancement. Each day becomes distinguished by some triumph of genius,

in science or art. What were once considered as wild and visionary conceptions, or extravagant and impracticable anticipations, have been more than realized. Enthusiasm, based on the profound convictions of fact and induction, instead of being deterred by the sinister smiles of incredulity, or the discouraging doubts of prejudice, now boldly announces what it knows can be accomplished, confidently appeals to experiment, for the verification of theory, and commands admiration for success, where public opinion had prognosticated disappointment and ruin.

Suggestions of what may be achieved, are no longer deemed the evanescent flashes of rapt imagination. The triumphs of erudition, talent and skill have been so numerous, so astounding, and so momentous, — have wrought such remarkable changes in the condition of nations, and given such a mighty impulse to individual exertion, that no one can look back from our present elevated position, for the brief period of half the age of man, without being overwhelmed with amazement, at the progress which has been made, in whatever tends to promote the comfort, independence and happiness of the people, and the grandeur of nations; and if we look towards the future, even with that limited power of prescience, which is founded on experience, who can comprehend the still more wonderful developements of mind, which this accelerated movement of the human race, is destined to exhibit; who will presume to scan the infinite resources of intellect, or dare to fix the bounds of enlightened genius, and say, — here shall your proud career be stayed?

In the vast republic of letters, science and art, how numerous are the votaries of truth, who are emulous for distinction, either as the heralds of some important fact, the discoverers of some great principle in philosophy, or as the originators of some new combination of the mechanical powers. No object, — not an incident occurs, — not an event or fact is promulgated, which does not immediately attract the eager attention of numerous individuals, in all quarters of the globe, who have made the particular branch of physics, or morals, to which each pertains, their peculiar and especial study; and the results of their several researches are but so many demonstrated truths, from which are ultimately deduced, by some master spirit of the age, those great theories and comprehensive systems, by which human reason is securely guided, in the future pursuit of knowledge. Logical precision, and mathematical exactness are the elements and tests of modern research. The understanding is addressed rather than

the imagination; proof has been substituted for hypothesis, and genius now relies on principles, instead of chance, for the attainment of its objects. Are we not then admonished to read without prejudice, to listen with a disposition to be instructed, and to examine with deep attention, whatever comes within the range of our observation; and be more cautious to condemn suggested inquiries, than fearful of being deceived, in the anticipated results, however startling, or apparently improbable their import. There is not an improvement, or discovery, — not an acquisition in knowledge, which had not its origin in some unobtrusive and long neglected fact, or some bold intimation, which seemed to forbid investigation, from its very magnitude. To advance, nothing must be disregarded. One momentary flash sufficiently illumines the tempest darkened night, to reveal the land-marks in our course; so, a single hint, — a word, may indicate the route to some unexplored region of inquiry. How fully is this illustrated even in the ranks of the vegetable and animal kingdoms. The moss which clings to the bleak rocks of the Azores, and an insect of Mexico, now furnish coloring pigments, which rival the imperial purple of the Tyrians. If man has not yet discovered the useful purposes to which all the productions of nature may be rendered subservient, — if of the fifty thousand species of insects, and the thirty thousand of plants, which naturalists have described, he has found only five or six of the former, and but a very few of the latter which are of any known value, he has, at least, ascertained sufficient to give assurance, that nothing has been vainly created, and that thousands of others may ultimately be made tributary to his wants, his comforts or his luxuries.

The history of the cultivation of silk in the United States, is invested with peculiar interest. Nearly a century had elapsed, after the first experiment, before it began to attract public attention; and had it not been for the industrious and intelligent daughters of Connecticut, that precious oriental race, of one of the most numerous, yet minute, feeble, short-lived, and neglected classes of the animal realm, would have been extinct in this country. By them, has its brief and precarious existence been watched and prolonged, with a vigilance and perseverance, as unremitted, and faithful, as that, which annually renewed and perpetuated the holy fire in the temples of Vesta. Some instinctive sentiment of its future importance, or some mysterious predestinate influence, appears to have impelled those self-created guardians of this sacred trust, to cherish and transmit it to an age,

when its intrinsic value, and their faithful and meritorious services, would be justly appreciated, and honored. When the ever changing fortunes, and peculiar situation of our country are considered, during the long period which has intervened, since the planting of the first mulberry seed, and the birth of the first silk-worm; when we estimate the adverse circumstances attendant upon this culture, and fully understand what patient attention, and determined zeal were required, in the divided occupation of preserving the insect, as well as its native plant, — for the latter is as indispensable for the procreation of its species, as for the construction of that sumptuous tent in which it expires, and leaves, as a rich inheritance to its patrons, to be converted into the most magnificent vestments of nations; when, in fact, all the various conditions for the successful management of these little Asiatic colonies are known, it looks like one of those inexplicable incidents, which seem to sanction a credence in fatality. Yet, after all, what is this fatality, — this destiny, which superstition announced, and ignorance has believed, but the necessary result of causes, sometimes capable of explanation, but often too recondite for human ingenuity to divine, still not the less certain of existence. Gravitation, heat, light, magnetism, and electricity, which have, through all time, been the gaze and admiration of the multitude, and subjects of the deepest research, and intense study, are but sublime effects, and philosophy has not yet been able to discover the cause of either of those great phenomena.

At all events, there has been a very remarkable and most propitious combination of circumstances, attendant upon this department of rural industry, which have, at last, brought it into such distinguished notoriety and general favor, that there is no longer any doubt of its rapid extension.

Here individual enterprise has achieved, what required the power and munificence of a Justinian, in the Bizantian empire, of a Henry IV. and his regal successors in France, and of the governments, monarchs, and princes of Venice, Genoa, Naples, and the other states of Italy. Without national patronage or encouragement, the cultivation of silk has reached a point, which gives assurance, that it will become as important to our agricultural, mechanical and commercial industry, as it has been to those of China, Hindostan, Persia and Southern Europe. If we had no statesmen like De Serres, or Colbert, or affluent nobles, like those who surrounded the thrones of the Eastern Continent, still the desired object has been as completely attained, by

the spontaneous and zealous efforts of a few private citizens in this republic. Du Ponceau, Pascalis, Cobb, Fessenden, Kenrick, Gay and Whitmarsh, with other intelligent and practical compatriots, have, by their extensive correspondence, numerous publications, experiments, discoveries, improvements and practical operations, given an impulse which is felt throughout the land; and multitudes of our most enlightened and energetic farmers and capitalists, are making demonstrations, which indicate the speedy realization of their most sanguine anticipations.

The first piece of silk made from the raw material, raised, reeled, thrown, dyed, and wove in this country, was a national flag. It was manufactured in an establishment erected by the venerable and illustrious Du Ponceau, and presented by him to Congress in 1831. It was immediately suspended in the Representatives' Chamber, over the portrait of Lafayette, as an appropriate emblem of national gratitude and respect, for that great and honored man, and as indicative of the favorable disposition of the government to naturalize one of the most valuable products of his native country; while it is a splendid memorial of the distinguished services of him, who so richly merits the thanks and benedictions of every American, for his liberal and successful labors, to enable them justly to appreciate, and avail of the advantages, to be derived from the culture of the material of which it is formed.

The name of Du Ponceau, will not only live in the memory of his fellow citizens, as a gallant soldier of the revolution, a learned and eminent jurist, "a ripe scholar," and one of the first scientific and literary men of the age, but as the generous promoter of national industry, — as a benefactor of the Republic.

REPORT MADE TO THE SOCIETY FOR THE ENCOURAGEMENT OF NATIONAL INDUSTRY,

BY MR SOULANGE BODIN,

IN THE NAME OF THE COMMITTEE OF AGRICULTURE,

On an experiment in breeding silk-worms, made, in 1835, *by Mr Camille Beauvais, on his estate of Bergeries de Senart, near Montgeron, in the department of the Seine-et-Marne.*

GENTLEMEN,—You have referred to your Committee of Agriculture, the examination of a letter, which was addressed to you, on the 20th of June last, by Mr Camille Beauvais. It calls your attention to

one of the most important subjects, of agricultural and industrious economy, which interests the age in which we live.

Indeed, gentlemen, among the thousand various branches of industry, encouraged and rendered fruitful by your institution, a certain number of which gradually attain perfection in each year, and which you are anxious to verify, reward and render profitable to all, there cannot but be perceived the favorable indications, and anticipated results of that great phenomenon, which characterizes modern society, — *Progression.* Everything advances and is elevated, under the same secret impulse, — individual benefit, towards the same apparent end, — the public good; and in this universal movement, which is governed by an exalted philanthropy, each receives quietly, in his turn, the reward of his efforts, under the common banner of circumspect emulation, which neither contains, or occasions the least germ of dissention, or active opposition.

But it is different, when one of those bold, exclusive, and innovating ideas, which are occasionally advanced, by ardent minds, and whose natural enthusiasm is sustained by profound conviction, which astonishes the multitude, and tends to displace some ancient order of things. These commanding ideas, necessarily, disconcert inveterate habits, as to the correctness of old opinions, and excite against them precedents, which are enveloped in the legitimacy of time. A conflict of opinions is then produced, during which the human judgment long combats natural facts, and truth, on whichsoever side she may preponderate, will, sometimes, be very dilatory in her triumphs.

It is, gentlemen, a spectacle of this kind which is now offered for your consideration, by an able agriculturist, who has established himself within a few years, near Paris, on an indifferent, refractory and arid soil. It has been said, that this man only wished to put his foot upon our land; that to advance, he calculated but little on the profits of the plough, and that he only sought a spot, where he could realize the treasure, which, as yet, existed, but in his head.

This treasure, which Mr Camille Beauvais, now offers to your inspection, was not, in fact, gentlemen, but an abstraction, which he could thus have stated:

"To lay the foundation of his own fortune and increase that of the nation, by an improvement, which will certainly promote the cultivation of silk, in the centre and in the north of France."

After many experiments, he believes, that he has, at last, caused a new fountain of private and public wealth to arise, out of his own

arid land, and far from desiring to engross it, for his exclusive benefit, he invites us to draw from this fountain, which will be inexhaustible, if his zeal for the public good, has not greatly deceived him.

Mr Camille Beauvais belongs to the South: he had only to establish his magnanery* in the South, and to manage it, in conformity to the system with which he was already familiar; he knew the efforts which had been vainly attempted in preceding ages to breed silk-worms in the North. Everything attracted him on one side, while all was repulsive on the other; but he said to himself:

"Every branch of industry is advancing; why does that of silk always remain, very near what it was, when it passed from Italy into France? The sciences, as physics and chemistry, — the recent discoveries in which have been so remarkable, and whose aid can be invoked, were then scarcely known to the husbandman; why then should this branch of industry remain irrevocably confined to its ancient cradle? Should the losses, which have sometimes been so discouraging, be attributed, rather to the constitution of the precious insect, by which this culture is maintained, than to the insalubrity of the situation, and the variations of the atmosphere, which have such a powerful influence upon a life, at the same so full and so brief? They cannot be imputed to the north, where the silk-worm is not now bred, when they so cruelly afflict the delightful climate of the south, which is reputed to be exclusively propitious to them. Wherever the mulberry tree grows and prospers, the worm which feeds upon its leaf, ought to be able also to grow and prosper. Do not perpetually neglect the accidental conditions of beings! Why cannot I create, under the shelter, where this worm accomplishes its destiny, an isolated climate, free from all local influence? I can, in fact, more easily protect them from the less sudden changes of the intemperate climate, of the north, than they can be screened from the capricious temperature of the south. What do I say? There is no longer either north or south; for I perceive that it is possible to command and combine, in their confined asylum, fire and water, — those two great promoters of all organizations, and to imitate, for them those winds, which maintain without, the salubrity of the air, and scatter to a distance deleterious effluvias."

I have put these words in the mouth of Mr Camille Beauvais, gentlemen, not to extol or over estimate his theory, but because they ex-

* The name given to the apartment in which silk-worms are bred.

press the bold and profound thoughts, which must have presided at his establishment, and contain the principles upon which all his labors were prosecuted. It was at his own expense, and his own risk, that under the influence of his own convictions, he, for seven years, put these principles in practice, with continually increasing results, without being discouraged by a few mistakes, which he nobly confessed, without being intimidated by the inquietude of his friends, or the doubts which he saw arise, like clouds, ready to obscure the brilliancy of his first successful experiment, and to blast, perhaps forever, his fondest hopes.

It would be superfluous to enter, here, into the general details of cultivation, which every friend of agriculture, is invited to examine, at the establishment of Bergeries. They have been described elsewhere; and that is not now the subject of inquiry; it is sufficient to say, that it is upon 67,000 mulberry trees, of the best species, and of the most luxuriant growth, among which are to be seen a great number of the Morus multicaulis, that Mr Camille Beauvais principally founds his hope, of a second annual brood of silk-worms, which he proposes to undertake. These trees, including nurseries and established plantations, contain sixteen hectares and a half of land.

The establishment, in its present condition, is capable of rearing annually the number of silk-worms which are produced from one hundred and fifty ounces of eggs. During the five last years the mean product of an ounce of eggs in the establishments of the south, has not exceeded from fifty to fiftyfive pounds of cocoons, that is to say, only about 10,000 silk-worms out of the 42,000 eggs, which an ounce contains, reached that last period, which unites a simple worm to the enjoyments of a refined civilization. On the contrary, Mr Camille Beauvais' first brood, gave him sixtyseven pounds of cocoons, for each ounce of eggs. He has been constantly progressing, during the years 1830, 1831, 1832 and 1833; in 1834, he obtained 104 pounds of cocoons. All these facts are generally known. His last brood gave him 137 pounds; this brood was from eight ounces of eggs, and the worms were kept in a temperature equal to from 18 to 20 degrees of heat according to Reaumur's thermometer,—[equal to 72 and 77 of Fahrenheit.] They continued their labors for thirtyseven days, and consumed 16,830 pounds of leaves, the product of trees, half of which were grafted and the other half seedlings. They yielded 1,101 pounds of cocoons, of the most beautiful quality, large, firm and of an admirable whiteness. It does not appear, that such a re-

sult has been obtained anywhere else, in ahy large establishment: nevertheless, Mr Camille Beauvais, is the first to inform you, that one of his pupils, Mr Henry Bourdon, who had recently left the Polytechnical School, and is a proprietor at Ris, terminated an experiment, in which the proportional product, amounted to one hundred and seventy pounds of cocoons, to an ounce of eggs.

We have seen that an ounce of eggs produces 42,000 worms; Mr Camille Beauvais employed eight ounces of eggs; he should, therefore, have had 336,000 silk-worms. He actually realized 1,102 pounds of cocoons; it requires, at Bergeries but 360 cocoons to make a pound; he has then obtained only about 286,520 silk-worms. He lost 4,000, when they began to rise, to form their cocoons, by the bad arrangement of the heaths, or twigs, and an imperfect ventilation. He has then lost in the first ages, including the eggs which did not hatch, 45,480.

It results from an analysis, which Mr D'Arcet has been so kind as to communicate to me, that the air of the magnanery of Bergeries, during the fourth age was slightly alkaline. The water, which was there condensed, by means of a globe filled with ice, and which was found to be as limpid as distilled water, was slightly alkaline. The nitrate of silver did not form a precipitate at the moment of admixture, but it immediately after assumed a faint brownish red color. At this period of the brood the ventilation was well regulated. The air was so little altered, that it was difficult to discover carbonic acid upon the tub of water, and eudiometrical experiments made with this air, either by phosphorus or deutoxide of azote, indicated as much azote and oxygen as the atmosphere; it contained very feeble traces of ammonia, combined with carbonic acid.

At the period the worms began to ascend, the ventilation, as has been stated, was interrupted and in part suppressed, by the heath; the air of the magnanery ceased to be pure. Mr Henry Bourdon, who made the analysis of the air, found it to be composed of

Azote and carbonic acid	82,57 parts
Oxygen	17,43
	100,00

It is known that atmospheric air contains 79 parts of azote and 21 of oxygen. It is apparent, then, that the air had become very much vitiated. At this period the water in the magnanery, and which was condensed, by the means of ice, was limpid; it had neither odor, nor

savor, was akaline, and not rendered turbid by the addition of nitrate of silver; but almost immediately assumed a faint brownish red color, and that there was suddenly formed, an abundant brownish red precipitate, which did not appear to have been perfectly defined.

An opinion can be formed of the effect produced on silk-worms, which are constantly confined in the magnanery, which is not properly ventilated, by the following experiment, which Mr D'Arcet made upon some which were reaching their last state, and which were bred in a pure air; he confined twelve large silk-worms taken in their fourth state, in a quart bottle, in which had been placed some mulberry leaves; at the end of twentyfour hours, the air contained in the bottle had diminished in volume, was alkaline and contained,

Azote	79,11 parts
Carbonic acid	17,50
Oxygen	3,39
	100,00

The air therefore, in the bottle was almost completely vitiated, one of the worms was dead; the others were shortened and shriveled, and of a dirty greenish yellow color, and scarcely moved; three died soon after being placed on fresh leaves; the eight others ate but little, three only made a small quantity of silk before they died, two changed into the chrysalis state, without spinning, and three died without spinning or changing.

I have before stated, that Mr Camille Beauvais should have had 336,000 silk-worms, from his eight ounces of eggs. He then realized from one hundred eggs only 85,27 cocoons, and lost 14,73 worms and eggs, which did not hatch. By adding to the 286,520 worms which spun, the 4000 which died, at the time of ascension, we have 290,520 which completed their growth. These worms consumed 16,830 pounds of leaves. Fresh leaves contain, of

Dried vegetable matter	32 parts
Water	68
	100

Each silk-worm, then, had eaten, in the whole course of its life 29 grammes of fresh leaves, or 6,28, g. of dry vegetable matter.*

* Mr D'Arcet has ascertained, that there are 5,58 parts of azote in 100 parts of the dry vegetable matter of the leaves. A silk-worm, then, does not find in all the leaves it eats during its whole life but 0,518, g. of azote. Silk contains 11,33 parts of azote in 100.

I have, gentlemen, pronounced the word *Pupils*. Mr Camille Beauvais defines himself to be a man of conviction and progression; but that conviction, that progression and his ardent and disinterested zeal loyally seeks to establish an empire, an extension, in which their influences shall indefinitely increase. To attain that object, he has gratuitously opened a school of theory and practice, whither resort the young proprietors from all parts of France. This year they hurried, — that is the word, to his establishment, to the number of fifteen. Among them are to be found, with Mr Henry Bourdon, the pupils of Roville, the Marquis Amelot, a large proprietor in Gatinais, the son of Baron Mallet, who has an extensive sugar refinery at Choisy-le-Roi, Mr Bella, son of the director of the model-farm of Grignon; Mr Baynard, late prefect of the Haute-Alpes, and of Maine-et-Loire, who is now establishing mulberry plantations near to Bergeries. After having employed a part of their time, in attending to the breeding of the silk-worms in all its minutest details, and assisting with their own hands, in the cultivation and management of mulberry tree, under the direction of a nursery man of the south, who is attached to the establishment, their worthy master assembles them, for two hours, in each day, for the purpose of instructive conversation, when they recapitulate, or compare all the observations of the day, or discuss all the advantages, which, from their elevated point of view and their social condition, they are enabled to perceive, their country will derive, from the interesting subject of their studies and experiments. What truly logical ideas, what lights, without shadows, what germs of amelioration, rendered fruitful by this powerful reconciliation of observations and facts, have already been produced, by those young and studious citizens, — the legitimate hope of Agriculture and the State! To present to you, gentlemen, in a single word, their deep conviction of the advantages they have gained, from their connexion with Mr Camille Beauvais, and the sentiments, which his generous attentions had excited in their hearts, I should inform you, that before their departure, they unanimously voted to present him a gold medal, as a brilliant testimony of gratitude, the most sensibly felt and the most worthily merited. This medal has been struck at Monnaie, but the resolution is yet unknown to Mr Camille Beauvais. A great number of persons have already made application to him, to be received at his establishment the approaching season.

One of these pupils, Mr Peycams, nephew of Mr Caussade, Col. of Artillery and proprietor of an estate in Guadaloupe, has paid particular

attention to the management of the *filature*. He is going to that Island, at the request of the principal planters, to instruct the black females, in the reeling of silk, from the cocoons; for this purpose, he will take with him the complete apparatus for a *filature*. But Mr Camille Beauvais, acknowledges, and has published in terms which at the same time delineate his character, his gratitude and his love for truth, that for the pleasing results which he has obtained this year, and which were chiefly produced by his own intelligence, the lofty reach of his genius and his determined perseverance, he is incontestably indebted to the apparatus for ventilation, which Mr D'Arcet has already made known to you, which was applied to Mr Grimaudet's very complete magnanery, and the plan and description of which, the Society for the Encouragement of National Industry has published in its *Bulletin*, under the name of *Salubrious Magnanery*, which Mr D'Arcet had given to it. After various experiments, Mr Camille Beauvais says, this simple and cheap apparatus has finally proved, what he had conceived might possibly be attained, and what he had for a long time sought; *an equal temperature and a pure air constantly renewed:* conditions, which joined to careful attention and cleanliness, approximate as nearly as possible, the artificial breeding of silk-worms, in those limited apartments, where it is necessary to confine them in Europe, to the most favorable condition in which they have been placed by nature.*

The first application of Mr D'Arcet's system of ventilation, at the establishment of Bergeries, has, at once, imperfect as must yet be, an operation, which, for want of time, could only be considered as an experiment, had a success, which cannot fail to interest every enlightened mind. God forbid, that what remains for me to say, should diminish the merit of the applicator, and his right to your respect! On the contrary, Mr D'Arcet, has, himself declared that it was Mr Camille Beauvais, who communicating to him an opinion, which that learned man had formed, in traveling through the south of France, on the culture of silk-worms, and had requested him to consider the subject, and make a plan of a magnanery. French agriculture, will please then, I hope, to unite in the same sentiment of esteem, the learned and the practical man. I say French agriculture, for it should not be doubted, if the interesting experiment which has been sub-

* There is in China, a wild species, which feed in the open air, on the mulberry trees of the country, and which have not yet been domesticated.

mitted to your consideration, should have such an important influence, on the production of silk in the central and northern parts of France, how much more efficacious still, will it be in ameliorating the culture of the south! Will not the most cautious men — those ancient agriculturists, who have so great a right to intrench themselves behind that prudence, which we respect in them, and which is the treasure of their life, wish at least, that such experiments be repeated and extended? But the subject is so important, and the inquiry so grave, that I request, gentlemen, your permission, to enter into some details, previous to presenting a short summary of the essential conditions, for the proper management of silk-worms, and the means, which are now employed, to render the air of the magnanery salubrious.

If the organization of the silk-worm is carefully examined, and it is found that they respire only by their stigmata,* and if the gas they expire, especially during the period of their last change, is analysed, no one can fail of being convinced, of the importance of a gentle and continuous circulation of air, in an apartment where millions of these little insects are assembled and extended on frames which emit deleterious exhalations.

On attentively observing the continual exertions which are made by these small animals, both by dilation and contraction, and which are repeated without cessation, especially, at the moment of moulting, it will be seen, that all their functions are in operation, with greater or less activity, according to the heat, to which they are subjected, and it will be readily perceived to what danger they are exposed, from sudden changes of weather.

Great humidity in the magnanery is of itself fatal to silk-worms, while it produces a fermentation in the vegetable and other matter which collects on the frames where they are fed, and thus vitiates the air they breathe; therefore cultivators dread, especially in the fifth state, the cold and damp winds of the south. Besides the exterior humidity, a great quantity is developed in the magnanery, from the leaves and from the worms themselves.

The dryness of the air, besides being essentially injurious, to silk-worms, as to all other animals, even when in the greatest possible purity, withers, and crisps the leaves; and the worms instinctly perceiving that they require a certain quantity of water in their food,

* The silk-worm, and the larva of other insects, instead of breathing through the mouth, like other animals, breathe through the spiracles or stigmata, which are holes in the rings on each side.

reject the leaves as soon as they wither; there is consequently the suffering of the worms, as well as the loss of leaves.

All intelligent cultivators know, from their own experience, how important it is, to fulfil all the conditions of a continual renewal of the air, a uniform temperature, and an invariable humidity; but from a want of the means for doing this properly, they are compelled to guard against the injuries which may arise, as well as they can, and to this end, they are in the habit of burning in the apartment aromatic plants, boiling vinegar, with cloves in it, sprinkling the worms with chloride of lime, &c. &c. But the inefficiency and even danger of these expedients is readily perceived.

Dandolo, the distinguished cultivator of Piedmont, delayed not in ascertaining that these means were detrimental to the silk-worms, and immediately and completely reformed, the art of managing his establishment. To purify a magnanery, he made holes in the floor, ceiling and lateral walls, for the admission of fresh air and the escape of these fumigations, which he had ascertained were dangerous; and in the magnanery, constructed on his plan and called *Dandolories*, the proprietor obtained from 100 to 110 pounds,* of cocoons, instead of from 50 to 60 for each ounce of eggs; but his imitators, unfortunately are but few, in consequence of the want of encouragement in Piedmont. Here is the subject presented for consideration, in France, where encouragements are not wanting.

Nevertheless the system of Dandolo is yet defective; he established his fireplaces or furnaces in the magnanery, and the immediate action of the heat which is developed, and the exhalations which arise from the combustibles, cannot but be injurious to the silk-worms. Besides, his means are often ineffectual, especially in lowery and stormy weather, when the air does not freely circulate, and when it is necessary to have recourse to fumigations of chloride of lime, the application of which, it is far from being practicable, at all times, to make, with the desirable exactness.

It is necessary, then, to employ more powerful and infallible means, for illustrating the principles of sanitory purification developed by Dandolo: it is thus that science assumes its control over the subject, and completely annihilates the action of exterior influences, removes the source of heat beyond the magnanery, and is enabled to realize, simultaneously, the four conditions, so essential to success in the management of silk-worms.

* The pound of 16 ounces.

In the system of D'Arcet, the magnanery is in the second story, and the furnace or colorifery, is in a small apartment in the lower story, which is called the air chamber. The air issues from this chamber into pipes, which extend the whole length of the floor of the magnanery, and from which it issues through circular holes of various sizes. In the ceiling, are made a number of conduits and openings, perfectly symmetrical with those below, and it is by these superior openings that the air escapes through a funnel into the chimney of the furnace, which receives the pipe of the colorifery, after having been introduced into the magnanery, by which a continual warmth is kept up.

It is only necessary, then, that a proper temperature and humidity should be maintained in the apartment; and this result is easily obtained, for, by the aid of a furnace, ice, moist cloths, and disecating substances, there can be produced heat, cold, humidity and dryness.

In the month of April, 1833, Mr D'Arcet sent to Mr Camille Beauvais, his plans of a "Salubrious Magnanery," and as the period of breeding the silk-worms was near, the application of the system, and a knowledge of the result, would be postponed for a year, if it was suffered to pass, Mr Camille Beauvais was impatient to test this scientific theory by an experiment, the success of which was guaranteed by his experience in the management of silk-worms. In a month he constructed a new magnanery, which was so judiciously arranged, as to insure to him all the advantages, which could be derived from the proposed improvements. He corrected, as soon as possible, such imperfections as necessarily arose from the novelty of the system applied to the rearing of silk-worms, and the precipitate manner, in which the work was executed.

Mr Camille Beauvois, immediately found, in the interesting and successful result which he obtained, the prize of his assiduity, and his devotion ;* and has the gratification of having demonstrated, more clearly, than had before been done, that a new era may be commenced in the culture of silk, — thanks to Mr D'Arcet's system of salubrity, for the application of which, it only requires a careful and attentive workman to execute the instructions which he has given, in a perfect manner.(1)

* The current price of raw silk, was at that time, twentyfive francs per half killogram, and Mr Camille Beauvais sold his for fifty. It was produced by that beautiful race called *Sina*, which Lewis XVI. obtained from Canton in 1784, and was by degrees changed, in consequence of the negligence and avarice of the first cultivators of this species of silk-worm ; but Mr Poidebard has been enabled, by long and assiduous efforts, to regenerate it in a remarkable manner, and Mr Camille Beauvais bas endeavored to restore it in all its primitive beauty.

Still, gentlemen, if the important fact which has been established, near the capital of the empire, seems to countenance those bright hopes, which numerous enlightened men have entertained, it is proper to declare, — it is proper to repeat, in the sincerity of truth, which repulses all equivocal triumphs, that whatever confidence this remarkable experiment merits, and has already obtained, it only appears, as yet, but as an isolated and very recent result, and is at present deprived of that influence, which can only be obtained by its reproduction, by different persons, under other circumstances and in other places, and it should also receive the sanction of time. The author of this experiment, merits encouragement, without doubt; the attention of those who are interested in it, ought, at the same time, to be roused, and possibly restrained; new trials appear desirable, to the true friends of our prosperity, — that is to say, gentlemen, to you all; it is important that those trials be continued, for that which attracted your attention, has also attracted the attention of the able cultivators of the South — strangers to all prepossessions, superior to all prejudices, they await new trials with an eagerness, the more legitimate, because they well know, that the experiments which are now making in the North, cannot but be advantageous to the South, which is ready to receive with gratitude new methods of culture which appear to them sufficiently well tested; they know that the industry on which large fortunes are founded in the South, will be able without injuring them, to create like fortunes in the North, and gradually relieve the common country from the tribute of fortyfive millions of francs, which it annually pays to foreigners for raw silk; and which the agriculturists of the North, hereafter the emulators and not the rivals of those of the South, will be able, in a quarter of a century, to divide with them, as brothers, the ever increasing fruits of their own industry.

From these various considerations, gentlemen, your Committee on Agriculture, has charged me with the honor to propose to you, that this report be inserted in the Bulletin, and referred to the Commissioners on Medals.

Approved, at a meeting held on the 30th of September, 1835.

SOULANGE BODIN, *Reporter.*

(1) It is highly probable, that the apparatus for heating green houses with hot water, or the cockle or furnace for warming private houses and public buildings, may be advantageously substituted for Mr D'Arcet's method. If the theory of Mr Beauvais should be deemed worthy of adoption in this country, the ingenuity of our enterprising citizens will, beyond a doubt, discover some simple, cheap, and better mode. — *Translator.*

ART. II.—*Influence of Temperature on Plants, &c.* Communicated by J. E. T.

SIR — According to accounts from all parts of the country, concurrent testimony has pronounced the winter now past, as the severest, in point of intensity of cold, and unintermitted duration, of any within the memory of man, and the usual thermometrical observations coincide with this fact. It becomes, therefore, a kind of interesting duty, for the lovers of horticulture and agriculture, to note down with as much precision as they are able, for the benefit of those who have to pass through seasons yet to come, any variation or new appearance in vegetation, which may, on fair rules of reasoning, be attributed to this unusual severity of temperature.

Trees and plants, both of the useful and ornamental species, are endowed with capacities enabling them to resist various degrees of cold, and any observation throwing light on this, at present, obscure portion of vegetable physiology, cannot fail of being gratifying to the lover of natural history. It is not improbable that the same may be the case with the insect tribe in its various stages of torpid existence, from the egg to the subterranean grub and chrysalis, — but this may be left to the entomologist, although certainly not without its interest to the cultivator. I therefore throw out the hint to your numerous readers and correspondents, to commit to the press, through the various agricultural and horticultural publications in the Union, all facts and observations in any way bearing on this subject; these may hereafter be collated and collected into a point, by able and experienced hands, and perhaps produce the result of some clear and obvious law of nature, the promulgation of which, may be eminently useful.

The geographical distribution of plants, is, at this moment, attracting much attention amongst botanists, and as the different zones into which it is divided, depends somewhat on the capacities of the various plants to exist and flourish in peculiar temperatures, much light might be expected on the subject, by correct observations during periods of its extremes. As a guide to some of these facts, I would offer the following points for remark, of course feeling persuaded that any one taking an interest in the subject, will soon find out for himself the appearances bearing upon it in the most direct manner.

It is well known that nature has provided protection in the shape of scales, and a gummy secretion, for the buds of many trees; among

the most conspicuous are those of the chesnut and varieties, and the butternut. Are these thicker, or the secretion in greater quantity than usual; or have the scales been more penetrated and destroyed by the action of the intense frost? Short hairs, (pubescence,) are also of use in protecting plants; are these more dense than usual?

In this neighborhood, from the falls of snow which covered the earth early in the autumn, the frost has penetrated but a little depth into the ground. Should any peculiar effect be observed it may, therefore, be attributed chiefly to the low degree of temperature of the atmosphere alone. It is very possible that many plants whose upper branches may have been cut off by the intense frost, are yet alive at the roots, and will make vigorous shoots in the spring and summer months, if not taken up under the idea that they have been frost killed; for many plants, *deciduous*, that is, torpid during the winter, when exposed to the open air, are full of life and viridity, when kept during this season in the green-house. Observations on the efficacy of the various artificial coverings made use of here, such as sea-weed, pine boughs, &c., will not be without interest.

From the cause above alluded to, of the frost having penetrated but a little way into the earth, it is presumed that the class of herbaceous perennial flowers, will not have suffered much. Woody shrubs, on the other hand, will have been more exposed, and many which thrive only in sheltered situations, have been, probably, killed; such as, perhaps, the double flowering Althea, (Hibiscus Syriacus) several of the later imported azaleas, &c.

It is, however, more to the fruit trees, that I would invite attention. Many of the pears are rather tender, so are several of the cherries and apricots; I have also known the imported raspberry to suffer from intense cold, as well as many of the newer varieties of strawberries. The action of frost on the wood of plants, is not much understood — whether it penetrates the bark covering and freezes the juices in the vessels, which by their expansion on being converted into ice, rupture and burst these vessels, and thus destroy the plant, or whether intense cold alters the state of these juices, and render them unfit for the support of vegetation, and what is the nature of this change, or, as is most probable, whether both these methods of action occur — whether frost has any effect on the ligneous fibre of various plants, and what that effect is. All these are interesting points for the vegetable physiologist.

It occurs to me, that a set of amusing experiments might be made

on the temperature of the internal parts of trees, by boring a hole nearly as deep as the centre of the trunk, and cutting a perpendicular slice out, so as to insert a delicate thermometer, which may be left there until the bulb of the instrument is grown over by the new made wood cicatrizing the wound of the auger. If this bulb were protected against the pressure of the growing wood and the index kept clear by the use of the knife, the bulb would always be in immediate contact with the sap vessels, and the temperature of the juices indicated; many curious observations would be then made, concerning the winter and summer temperature of the sap, and its different degrees in different trees. The blood, which circulates in the human body, has, I believe, always an equal temperature in healthy persons. In various animals it differs. This may be the case with the fluid which circulates in different plants. Folding bands of hay around the trunks of trees, has been long known as an efficient protection against severe cold. This argues that some direct effect is produced on the bark by frost. The Boston market has been tolerably well supplied with winter spinach, notwithstanding the intense cold. This vegetable, I am informed, is covered with boards and then with sea-weed or other litter; the before-mentioned early snow has also been a favorable circumstance for this plant. Should any observations occur to me, I shall take the liberty of sending them to your Register.

Yours, truly.

Art. III. — *Some Observations on the Flashes of Light from Flowers.* By Mr J. R. Trimmer, Brentford.

The power of some plants to emit flashes of light, is a subject so curious as to be deserving of more investigation than has at present been bestowed upon it. It is thus described in a note in Darwin's Botanic Garden, vol. 2, page 144: "Miss E. C. Linnæus first observed the *Tropœolum majus*, or Garden Nasturtium, emit sparks or flashes in the morning, before sun-rise, during the months of June or July, and also during the twilight in the evening, but not after total darkness came on; these singular scintillations were shown to her father and other philosophers, and Mr Wilcke, a celebrated electrician, believed them to be electric. Nor is this more wonderful than that the electric eel and torpedo should give voluntary shocks of

electricity; and in this plant perhaps, as in those animals, it may be a mode of defence, by which it harasses or destroys the night-flying insects which infest it, and probably it may emit the same sparks during the day, which must then be invisible. This curious subject deserves further investigation. The ceasing to shine of this plant after twilight, might induce one to conceive that it absorbed and emitted light like the Bolognian Phosphorus, or calcined oyster shell. The light of the evening, at the same distance from noon, is much greater, as I have repeatedly observed, than the light of the morning; this is owing, as I suppose, to the phosphorescent quality of almost all bodies in a greater or less degree, which thus absorb light during the sunshine, and continue to emit it again for some time afterwards, though not in such quantity as to produce apparent scintillations."

On the same subject, Darwin has an additional note in the same volume, page 182. "In Sweden a very curious phenomenon has been observed on certain flowers, by Mr Haggren, Lecturer on Natural History. One evening he perceived a faint flash of light repeatedly dart from a marigold; surprised at such an uncommon appearance, he resolved to examine it with attention, and to be assured that it was no deception of the eye, he placed a man near him, with orders to make a signal at the moment when he observed the light. They both saw it constantly at the same moment. The light was most brilliant in marigolds of an orange color, but scarcely visible in pale ones.

"The flash was frequently on the same flower two or three times in quick succession, but more commonly at intervals of several minutes; and when several flowers in the same place emitted their light together, it could be observed at a considerable distance.

"This phenomenon was remarked in the months of July and August, at sunset, and for half an hour after, when the atmosphere was clear; but after a rainy day, or when the air was loaded with vapors, nothing of it was seen.

"The following flowers emitted flashes, more or less vivid, in this order: — 1. The marigold *(Calendula officinalis)*; 2. Garden Nasturtium *(Tropæolum majus)*; 3. Orange Lily *(Lilium bulbiferum)*; 4. African Marigold *(Tagates patula et erecta)*. Sometimes it was also observed on the Sun-flower *(Helianthus annuus)*; but bright yellow, or flame color, seemed in general necessary for the production of this light, for it was never seen on the flowers of any other color.

"To discover whether some little insect, or phosphoric worms,

might not be the cause of it, the flowers were carefully examined, even with a microscope, without any such being found. From the rapidity of the flash, and other circumstances, it might be conjectured that there is something of electricity in this phenomenon. It is well known, that when the pistil of a flower is impregnated, the pollen bursts away by its elasticity, with which electricity may be combined. But Mr Haggren, after having observed the flash from the Orange lily, the anthers of which are considerable space distant from the petals, found that the light proceeded from the petals only, whence he concludes, that this electric light is caused by the pollen, which in flying off is scattered upon the petals."

I am not aware of any other author who has added any new fact to those already mentioned by Darwin.

I have often observed the curious circumstance of the flashing of flowers, without being at all able to ascertain its cause. Sometimes I have been almost led to suppose it to be an optical deception, occasioned by an impression made on the eye by the bright color of the flowers from which the corruscations seemed to proceed. But at times I have seen the flashes of light so vivid and plain, and extend to so great a distance, that it is impossible for me longer to entertain that opinion; besides, too, I have seen the flashes proceed from pale colored and even white flowers, which would not make that impression on the eye. On the whole, I am much inclined to believe it to be electric, particularly from a circumstance which occured a few years ago. In walking in my garden in the evening, in which was a considerable quantity of Nasturtium in bloom, not at all thinking of the flashing of plants, I was struck by the very vivid flashes that proceeded from them, the scintillations were the most brilliant I had ever observed, and at the same time the sky was overcast with a thunder cloud; directed by this circumstance, I have on several occasions looked for the flashes, when in the evening there has appeared electric clouds collecting, and have always found them, at that time, most to abound, and to be most brilliant. My observations, in this respect, seems to differ from that of Mr Haggren, who only witnessed plants to flash on clear nights.

All the plants mentioned by Mr Haggren I have observed to flash, with the addition of many others. The Nasturtium is that in which I have most frequently seen the most brilliant flash; the Scarlet Geranium I have observed as vivid as any flower, but I have seen them in many lighter colored flowers, though much fainter, and even

in white flowers, particularly in the white Rose, and a white species of Œnothera.

I have troubled you with these particulars, in the hope that yourself, or some of your correspondents, may have some further facts on the subject to communicate, or that at all events some of your readers may be led to make observations and experiments in regard to so interesting a subject. — *Paxton's Magazine of Botany, page* 193.

ART. IV. *Description of Select Hardy Herbaceous Plants, suitable for Ornamenting the Parterre, Border or Shrubbery.* Communicated by Mr JOSEPH BRECK.

(Continued from page 144.)

THE Natural order Campanulaceæ contains nearly three hundred species of plants, mostly natives of temperate regions, and constitute a class whose chief value is in their beauty, and from these a goodly number of highly ornamental border herbaceous perennials may be selected, most of which may be found in the genus Campanula, its type. We have already noticed the family of Lobelias, which have been united by some Phytologists in the same natural order with Campanulaceæ; but by the most modern and correct classification they have been separated. Lobelia, should then be arranged in the natural order Lobeliaceæ, instead of Campanulaceæ, as it is placed in March number, page 84. There is, to be sure, a close affinity between the two orders, but a distinction sufficient for their separation. One of the most prominent distinctions is in the form of the corolla, which is regular in Campanulaceæ, and irregular in Lobeliaceæ, with numerous other minor differences known to the botanist. The milky juice of the former is slightly acrid, but the roots and young shoots of many of the species are occasionally used for food; while the excessive acridity of the milky juice of the latter, is in all cases suspicious, and in many species dangerous. "*Lobelia longiflora*, a native of some of the West India Islands, is one of the most venomous of plants, proving fatal to horses who eat it, swelling until they burst. Taken internally, it acts as a violent cathartic, the effects of which no remedy can assuage, and which ends in death."

"*Campanula*. A diminution of *campana*, a bell; on account of the form of the corolla, which resembles a little bell."

Class Pentandria. Order Monogynia. The genus has monopetalous (of one piece,) superior flowers; seeds in a capsule: corolla campanulate, closed at the bottom with staminiferous valves; stigma 3—5 cleft; capsule inferior opening by lateral pores.

We have one indigenous species, which is very pretty, and worthy a place in the border; found abundantly on the banks of Merrimac river, at and above Lowell. It is very much like C. rotundifolia of England. Having cultivated them side by side, we can see but a shade's difference. Mr Eaton calls our species also *rotundifolia;* each species has nearly round, or heart kidney crenate radical leaves, from which the specific name is given, and linear entire cauline ones, with drooping, solitary, fine blue flowers; those of the English species being rather the largest, with the cauline leaves, a little broader. The common name with us, is Flax bell flower, or Hair bell. It is in flower July and August; 1 foot high.

Campanula medium. *Canterbury Bells.* This species with its varieties, may be considered one of our oldest ornamental plants, having for a long time been cultivated in our gardens; it is, nevertheless, a showy plant, and will doubtless always be retained, as a prominent ornament of the border. The varieties are rose, blue, and white, double and single. The double varieties, however, are much inferior to the single ones, and will be cultivated only for their singularity. Being biennials, it will be necessary to sow the seeds every year. The young plants must be transplanted to the place in which they are to flower in August or September, for if deferred until spring the bloom will be greatly weakened; the same holds good with all biennials, and most seedling perennials.

Campanula persicafolia. *Peach leaved Campanula.* This is one of the finest species, containing a number of beautiful varieties, with large showy flowers, more bowl shap ed than the last. The varieties are single and double blue, single and double white, maxima or large peach leaved, and grandis or large flowering; all of them are perfectly hardy, with handsome foliage, which makes them valuable as border flowers. Stems angular; leaves stiff, obsoletely crenate serrate; radical ones, oblong ovate; cauline ones, lanceolate linear; three feet high, in flower from July to September. The white varieties are not common with us.

Campanula pyramidalis. *Pyramidal Bell Flower.* This is a grand ornament when cultivated in perfection, forming a pyramid from four to six feet high, producing innumerable flowers for two or

three months if shaded from the sun. It was formerly a great favorite in England, but its popularity has long since passed away to give place to other more fashionable flowers, which have in their turn also been succeeded by other rivals more fair. But the old fashioned Hollanders are not quite so fickle; flowers with them seem to be esteemed, notwithstanding their antiquity. The pyramidal bell-flower is said to be in demand there still, as an ornament to halls, staircases and for being placed before fire-places in the summer seasons. We have seen some splendid plants the past season at Belmont Place, under the care of Mr Haggerston.

"In its cultivated state, it has thick ramose roots, which are milky; oblong leaves, and strong stalks, from the sides of which the flowers are produced for more than half their length. The most common color is blue, but there is a variety with white flowers. It is a native of Istria and Savoy, and was cultivated by Gerrard in 1596."

"*Propagation and Culture.* By seed, cuttings from the stem, or by dividing the roots; the last method makes the strongest plants in the shortest time. The season for this operation is after the bloom has faded in September; the sections are to be planted in pots, and protected by a frame during winter. In spring they may be transplanted into large pots, and in the beginning of summer into still larger ones, in which they are to flower the summer following."

"*By Seeds.* The plants so raised, Miller says, are always stronger, and the stalks rise higher, and produce a greater number of flowers. Good seeds are to be obtained by placing a strong-flowering plant in a warm situation against a wall or under a glass case. They are to be sown in pots of light earth soon after being gathered, protected by a frame during winter, and will come up in the spring. When the leaves decay in October, they are to be transplanted to beds of light sandy earth, without any mixture of dung, which is a great enemy to this plant. Here they are to remain two years, being protected by rotten tan; they are then to be removed to their final destination in September or October, and the year following, being the third year from sowing, they will flower. The plants, Miller observes, of this species, as of many others that have been propagated by roots, offsets or cuttings, do not so readily bear seeds as those which have been raised from seed.

"The *C. Carpartica, grandiflora,* and several other showy species, may be similarly treated."—*Loudon.*

Seedling plants in our climate will flower the second year gener-

ally, some not until the third. A slight protection is necessary during winter. Under our fervid sun, there will be no difficulty in ripening seeds.

Campanula grandiflora is now separated from Campanula and is united with the small genus *Wahlenbergia* and is called *Wahlenbergia* grandiflora. For a description of it, see page 116 of the present volume. Campanula trachelium, *Throatwort*. There are four varieties of this species, viz. single and double blue, single and double white. A native of Britain woods, three to four feet high, with flowers from July to August. Stem angular; leaves stalked; calyx ciliated; peduncles trifid.

Campanula rapunculus. *Rampion*. A native also of the woods of Britian and cultivated not only for ornament, but also in " France and Italy, and sometimes in Britain, for the roots, which are boiled tender and eaten hot with sauce, or cold with vinegar and pepper. It is sown in the spring on deep light soil in drills, and will be ready for use by the autumn of the same year. C. persicafolia and rapunculoides may also be cultivated for the same purpose." A biennial, with purple flowers in July and August, three feet high.

Campanula glomerata. *Cluster flowered*, " is a handsome rock or pot plant: it requires a dry lean soil, otherwise, as in most plants, the flowers lose the intensity of their color in that which is very rich." Flowers purple, in clustered heads in May and June; two feet high; a native of Siberia. Leaves scabrous, oblong lanceolate sessile; Campanula urticifolia, speciosa, versicolor, azurea, bononiensis, lactiflora, aggregata, with numerous other species are worthy of a place in every garden, as they are easily cultivated, succeed admirably in our climate, and will endure the severest of our winters. But a small portion of this large genus require protection.

Papaver, (poppy), Class Polyandria (many stamens), order Monogynia, is the type of the *Nat. Ord.* Papaveraceæ which contains a few beautiful perennials, but mostly annuals; the properties of which are well known as possessing narcotic qualities. Eschscholtzia californica, and Argemone grandiflora, have within a few years past become popular border annuals, but with the protection of a frame perennials. The best way to propagate them, is to sow the seeds in August; the young plants will then stand the winter and flower earlier and much stronger than when sowed in the spring. They continue flowering all the season even after the frosts have commenced in autumn. The double variety of Eschscholtzia is propagated by dividing the roots,

and requires some care to keep it through the winter without the protection of a green-house. The single variety, after all, is the prettiest; a large patch of it with its hundreds of brilliant yellow and orange flowers, opening to the sun from day to day for months, surrounded by their delicate glaucous foliage, is an interesting sight. E. crocea is a beautiful new variety not much disseminated, with saffron colored flowers.

The genus was named in honor of Dr Eschscholtzia, a botanist. It was introduced into England from California in 1826.

" Argemone. From *argema*, the name by which the cataract of the eye was known, and which was thought to be cured by the plant." The seeds of A. mexicana are said to be much stronger narcotic than opium. The genus has a three leaved calyx, six petals, and a capsule half valved.

Argemone grandiflora is the most showy of the genus, a native of Mexico, and the first introduced into this country: its large flowers with delicate white petals and numerous yellow stamens, make a splendid appearance, and we think much superior to

Argemone ochroleuca with pale yellow flowers: the leaves, capsules, and the whole plant are armed with formidable spines, and having once had the hands or any part of the body come in contact with them, the plant will be forever after viewed with feelings far from those of pleasure.

Argemone barclayana is equal to it, in its powers of annoyance, but its more showy, brilliant yellow flowers, make amends, in some measure for its repulsive appearance.

" Papaver. Said by De Theis, to have been so called from the Celtic *papa*, which signifies pap, or the soft food given to children, in which the seeds were formerly boiled to make the infants sleep." Capsule one celled, opening by pores under the persistent stigma: Calyx two leaved: petals four. A showy well known genus, with large brilliant, but perishable flowers. It is a pity this family of flower are so unpopular, for they are truly beautiful, and were it not for their bad character, and the propensity they have to make themselves too common, would undoubtedly, be thought much of. Papaver Rhœas, contains numberless varieties with double, semi-double, and single flowers of every shade of red, lilac, purple, white edged, variegated and mottled. P. somniferum, the true opium poppy, in its double varieties, is equally variable as the last, sporting into almost every hue, except yellow and blue. The variety *picotee* of recent introduction

is the most elegant. Some of the flowers are white or rose, delicately spotted on the margin of the petals with red; the number of the petals is surprising, and we are led to wonder at the transformation, which cultivation has made in a flower with only four petals, into one in which they are almost innumerable.

Papaver orientalis. *Oriental poppy.* This is a most magnificent perennial, and worth all the rest of the poppy tribe. Its large, gorgeous, orange scarlet flowers, display themselves in the month of June. The bottom of the petals are black; the stigma is surrounded by a multitude of rich purple stamens, the anthers of which shed a profusion of pollen, which powders over the stigma and the internal part of the flower, giving it a very rich appearance.

The flower stems are rough, three feet high, each one bearing a single solitary flower, five or six inches in diameter; a clump with twenty or thirty of these flowers, makes one of the most conspicuous and showy ornaments of the garden. Leaves are scabrous (rough) pinnate serrate. Propagated by dividing the roots, which should be done as soon as the foliage has died down in August, as it commences growing again in September and throws up leaves which remain during winter, it being one of the most hardy plants. If deferred until spring, if it flowers at all, it will be weak. It may also be propagated from seed, but does not commonly flower until the third year. A native of Levant.

Papaver bracteatum. *Bracted poppy*, is another superb perennial very much like the last, a native of Liberia. The flowers are a deeper red, and the only essential difference is in the leafy bractes, by which the flowers are subtended. Propagated in the same way; with us, it has not flowered so freely. Neither the flowers of the Argemone, Eschscholtzia, or any of the tribe are suitable for bouquets, not only on account of their transitory nature, but also on account of their propensity to invite to the arms of Morpheus, "the sleepy goddess," to whom the poppy is said to be dedicated. "Papaver cambricum, is admired for its yellow petals." It is now called Meconopsis cambrica; not common with us. There are also a number of other species and varieties of perennial poppy, as P. nudicaule, with two or three varieties with yellow, and one with scarlet flowers, from Siberia, one foot, to one and a half high. P. pyrenaicum, from the Pyrenees, with yellow flowers and a variety with red, one foot high. P. alpinum from Austria has white flowers three quarters of a foot high.

Glaucium. So called on account of the leaves and the whole

plant being covered with a glaucous bloom. The flowers of all the species are fugacious, but are daily produced in long succession.

Calyx two leaved; petals four; pod two-celled, linear, 2—3 valved; seeds several, dotted.

Glaucium fulvum. *Horned poppy.* It has an unlucky common name, otherwise it would perhaps, be more generally introduced into the garden than it appears to be, as it deserves a place in every collection, not so much for its flowers, which are very pretty, but particularly for its beautiful "sea green dew-bespangled leaves," which are universally admired, and peculiar to the genus. The flowers are yellow or orange, and continue through the season. It is a biennial, a native of the South of Europe. Stem smooth; cauline leaves roundish sinuated; pods rough; flowers sub-sessile.

"The whole plant abounds in a yellow juice, is fœtid, and of a poïsonous quality, and said to occasion madness."

G. luteum with yellow, and G. phœniceum with red flowers, are annuals.

Sanguinaria Canadensis. *Blood Root. Puccoon. Indian paint.* A native of our own woods, deserving a place in the garden, where it flourishes with increased beauty, and constitutes one of its prettiest vernal ornaments; displaying its glossy, eight petalled white flowers early in April. By cultivation, undoubtedly, its numerous, oblong yellow stamens, may be converted into as many petals. With this in view the seeds must be sown: a few generations of plants may give us monstrosities, equal to those exhibited in the rose, poppy, or any other double flower. Calyx two leaved; petals eight; pods ovate, two celled; the only species, if *S. grandiflora* is only a variety, which it probably is.

The generic name is "from *sanguis*, blood. All parts of the plant on being wounded discharge a blood colored fluid. This is a singular and delicate looking plant. It has a tuberous fleshy root with red fibres and a reddish juice; from each bud of the root there springs only a single fig-like glaucous leaf, with a flowered scape; the flower has no smell, and is very fugacious." It is said the Indians stain themselves with its red juice. "The root is a violent emetic." Easily propagated by dividing the roots in the fall or summer.

The curious genus Saracenia belongs also to the *Nat. Ord.* Papaveraceæ, and has been described in Vol. I. page 64. In that account there is an error of the press, were instead of *Panama*, it should read *Canada*. A plant suitable only for moist, or wet ground.

S. flava, a yellow species from the south, we have seen at the Botanic Garden, Cambridge.

The *natural order* Rosaceæ contains many beautiful flowering shrubs or trees, but few ornamental herbaceous perennials, excepting the genus Spirea already noticed, and Potentilla and Geum, which afford a few, belonging to the *artificial class* Icosandria. *Order* Polygynia. None of the plants contained in Rosaceæ are unwholesome.

"Potentilla. In allusion to its supposed *potential* virtue in medicine. These, however, appear to consist of nothing beyond a slight vulnerary quality." Calyx ten cleft; corolla five petalled: seeds naked, wrinkled, affixed to a small, juiceless receptacle.

This is a numerous genus, consisting of strawberry like looking plants with mostly yellow flowers.

Potentilla atrosanguinea. *Dark Blood Colored Potentillas.* This is one of the finest species with beautiful foliage, and blood colored flowers from Nepal, one and a half foot high, in flower from May to September. Leaves ternate stalked; leaflets obovate, cut serrate, white with down beneath; Sepals elliptical; Petals obcordate. Propagated from divisions of the root, and from seed.

Potentilla formosa. Synom. Nepalensis. This is another beautiful species from Nepal, with fine rose colored flowers, which are produced the greater part of the season. Radical leaves quinite, cauline ones ternate; leaflets cuneate oblong serrate; stipules large adnate entire; propagated the same as P. atrosanguinea and all the other species.

Potentilla splendens, has yellow flowers of not much beauty, but the leaves are elegant, being silvered over with a silky down, and interruptedly pinnate. Flowers dichotomous, in corymbs; from Nepal.

Potentilla grandiflora has fine large yellow flowers — a native of Siberia.

Potentilla Russelliana, is a splendid hybrid with scarlet flowers.

P. Hopwoodiana with rose and scarlet flowers is also beautiful. Most of the species, which are numerous, are pretty, but those named are the finest. With the exception of the two last, which we have not had an opportunity to try, they all stand the winter well: they succeed best in light soil.

"Geum from *Geyo*, to give a relish." The roots of Geum urbanum, chewed in the mouth, correct a disagreeable breath. "Gathered in the spring and put into fresh ale, they give it a pleasant flavor, and

prevent its turning sour." But the only species worthy the attention of amateurs are Geum quellyon or coccinnea, G. hybridum, and the one of more recent introduction, G. grandiflora.

Geum coccinnea "is a very desirable plant for the borders, much esteemed in Europe, with scarlet flowers from May to October, and perfectly hardy. A native of Chili, introduced in 1826; from one to two feet high.

Geum hybridum, has brown red flowers in June and July one foot high.

Geum grandiflora has large scarlet flowers.

Geum rivularis, common in our wet grounds in company with *Senecio aurens*, is in flower about the first of June, and conspicuous for its high, nodding, dark colored flowers. For the florist it has not great attractions, but with the botanist it is a fine looking plant and may be introduced into the borders for the sake of variety, as it costs nothing but the trouble of taking up.

Art. V.—*Extracts from Foreign Publications.*

Paxton's Magazine of Botany and Register of Flowering Plants. Edited by J. Paxton, F. L. S. H. S. Published monthly. Price two shillings and sixpence; each number containing four beautifully colored plates.

We have received the December, January and February numbers of this splendid work, which we consider one of the best of the English periodicals, containing much original, practical information. The work has been in existence only two years. It contains also numerous wood cuts, illustrating many systems of heating by hot water, plans and sections of plant-houses of various kinds, machines, instruments, utensils, plants, &c. Comparing it with other foreign works, we should consider it a cheap publication, although some of our readers may be startled at the expense, which amounts to the sum of from ten to twelve dollars per annum when delivered in this country.

"*Natural order* Compositæ. *Syngenesia Frustranea Calliopsis bicolor atrosanguinea.* Crimson two colored Calliopsis. Synomyms, Calliopsis sanguinea,

Coreopsis tinctoria atrosanguinea,

Coreopsis sanguinea.

A beautiful new variety of the common *Calliopsis tinctoria* formerly *Coreopsis tinctoria.* The rays of the flower of this elegant variety, are, dark crimson, sometimes bordered with yellow, fringed and lacerated.

The flowers are liable to vary, some being entirely of that fine deep blood color, which composes the centre of the old variety, and others have a very narrow margin of rich yellow.

It is perfectly hardy, and, like the C. bicolor, requires the most simple culture, the seeds merely requiring to be sown in the open border, and the plants kept from weeds. Common light loam suits it very well. The generic name is derived from the Greek word *kallistos*, most beautiful, and opsis, *eye*, or most beautiful to the eye, alluding to the splendid show made by the flowers when expanded. The specific *bicolor* is given from the two very distinct colors of the flowers. It is not known who originated or introduced this fine variety."

"*Natural order* Scrophularinæ. *Diandria monogynia. Calceolaria hopeana.* Mr Hope's slipper wort. Green-house perennial. *Stem* a foot or more high, clothed with pubescence. *Leaves* broadly ovate oblong, stalked, wrinkled, and veiny, unequally toothed, hairy, large, six inches long, and three or four broad. *Flowers* numerous, corymbose, pendulous. *Flower stalks* slender, an inch and a half long. *Calyx*, segments green, ovate, acute, rather reflexed. *Corolla* bright yellow, two lipped; upper lip short, shaped like a helmet; lower lip large, much inflated, with three to five ribs, spotted and striped with dark red inside the mouth.

This beautiful hybrid was raised a few years ago, betwixt *C. corymbosa* and *C. plantaginea.* It is an exceeding free flowerer, and the color of the flowers are of so rich a yellow that it is a very desirable plant for the green-house."

"*Calceolaria corymbosa, var. Jupiter.* Jupiter calceolaria, or slipper wort. *Stem* a foot and a half or two feet high, covered with pubescence. *Root leaves* oblong lanceolate, obtuse, doubly notched. *Stem leaves* ovate, obtuse, opposite. *Corymbs* forked, consisting of thirty or forty flowers. *Calyx* ovate, acuminate. *Corolla*, upper lip small, yellow, incurved; lower lip large, of a deep brownish red, with a yellow border, and slightly notched; inside purple at the mouth, and below yellow.

This is one of the many beautiful varieties of the *Calceolaria* raised by Messrs Young. It is certainly a very splendid kind, and

well deserves to be in every collection. It is nearly, if not altogether, hardy. Nevertheless it is best, whatever kinds are grown in borders, to shelter them from excessive wet in winter, if they are not taken up and placed in pots."

Natural Order Cinchonaceæ. *Pentandria monogynia, Rondeletia speciosa.* Showy Rondeletia. Stove plant., compact dwarf shrub. *Stems* smooth, erect, branching, yellow green, slightly colored with rose-color when young, afterwards becoming red, and finally, when the wood is old, of a reddish brown. *Leaves* obcordate, that is, betwixt oblong and heart shaped, acute, opposite, dark glossy green on the upper side, paler and often slightly tinged with red, on the under. *Flowers* terminal, in corymbs, very showy. *Calyx* five parted, segments acute, yellowish green, tinged with red. *Corolla* tube three times the length of the calyx, rose-colored; limb five, and occasionally six-parted, lobes rounded, very rich orange red, darkest at the extreme edges, and becoming lighter towards the centre of the flower; centre of the flower, bright orange yellow; eye, dark crimson.

According to Messrs Loddiges, this brilliant plant is a native of the Havanna, whence it was received at Hackney through the kindness of their friend, W. J. MacLeag, Esq. in 1830, and has since flowered in the stove beautifully. The flowers are exceeding rich in color, and make a most striking appearance, being quite as splendid as *Ixora coccinea*, if not more so.

It requires the stove, and should be potted in loam and peat, and may be increased by cuttings. The generic name is given in honor of a physician named Rondelet, and the specific name from the showy appearance of the plant when in flower.

"*Natural Order* Polemoniaceæ. *Pentandria Monogynia. Phlox Drummonii.* Mr Drummond's Lichnidea. *Plant* annual. *Stem* from a foot to a foot and a half high, covered with long hairs. *Leaves* on the lower part of the stem opposite, on the upper alternate, oblong, acute, rather cordate at the base, hairy on the under side, bright green, and partly clasping the stem. *Corymbs* terminal. *Calyx* of fine acute segments, being like the stem, bright green. *Corolla* salver shaped, tube long, very hairy, pale rose colored; limb spreading, pale rose colored without, rich rosy red within; eye deep crimson; throat yellow."

This beautiful species was raised under the care of Mr Campbell, Curator of the Botanic Garden, Manchester, from seed which arrived from the late Mr Drummond, in March, 1835.

Dr Hooker states the plant to be a native of Texas, and named by him after its indefatigable discoverer.

"Should this lovely species turn out to be an annual, which to all appearance it will, it must be regarded as a novel feature in this favorite genus. The plant is perfectly hardy, and will prove a great ornament to the flower garden."

"*Natural order* Solaneæ. *Pentandria Monogynia. Petunia linearis.* Narrow leaved Petunia.

Synonyms, Salpiglossis linearis,
Nirembergia intermedia,
Petunia linearis.

Plant a small shrub, covered thickly with glandular hairs. *Stems* upright, branching, clammy, about a foot high. *Leaves* alternate, oblong, narrow, blunt, about half an inch long, pale green. *Flowers* terminal, or situated opposite the leaves, very copious, and when expanded shining in the sun like crimson velvet. *Calyx* campanulate, five-toothed. *Corolla* funnel shaped, covered on the outside with soft hairs, hardly an inch long; tube orange, beautifully veined with purple, somewhat longer than the calyx; throat bright orange within; limb five lobed, of a rich crimson purple, very brilliant in sunshine; the centre as it approaches the throat, very dark, towards the border lighter, and more tinged with blue. *Stamens* all fertile.

This exceedingly pretty plant is a native of Buenos Ayres, where it was discovered growing in sandy plains by Mr Tweedie, who transmitted the seeds of it to Mr Niell, of Cannonmills, in 1832; from this seed one plant was raised, which flowered in the stove in September, 1833. The habit of the plant is that of *Nierembergia;* and when quite young and out of flower, they can scarcely be distinguished from N. gracilis, except that the leaves of the latter are rather narrower.

Natural order Rubiaceæ. *Tetrandria monogynia, Ixora Bandhuca.* Bandhooka ixora. A bushy shrub; *branches* numerous; whilst young, smooth and bright green; when old, rather rough and of a dull brown. *Leaves* oblong, blunt, smooth, and shining, opposite, having short foot-stalks, but appearing to clasp the stem. *Flowers* numerous, in corymbs, terminal. *Calyx* rather purple colored. *Corolla* scarlet at first, and afterwards becoming darker until it is dark crimson; tuble slender, more than twice as long as the expanded limb; *segments* of the limb elliptic-ovate, spreading; berry purple; little larger than a garden pea.

It is a native of Hindostan, from whence it was introduced by Sir Abraham Hume, about the year 1812. In its native country it is said to form a good sized bush, which at the season of flowering makes a splendid show; indeed, in this country, when the plant is well grown, the corymbs of flowers are large, and the petals well expanded; the richness of the crimson color being contrasted with the bright green of the leaves, together with the dwarf habits of the plant, the whole forms a spectacle scarcely surpassed for splendor by any of the other inmates of our stoves. It requires to be constantly kept in a damp stove, with much the same temperature as for Orchidæ.

"*Natural Order* Orchideæ. *Gynandria monandria, Epidendron fragrans.* Sweet scented Epidendron. This species is not so remarkable for the beauty of its flowers as for the very delightful fragrance they emit when expanded; we cannot describe this better than to say, that it greatly resembles that of the flowers of the hawthorn when first open in spring, only the scent in these is far from being so powerful as that of the Epidendron. The flowers continue without fading for a long time. *Flowers* greenish yellow. The generic name is derived from the Greek *epi*, upon, and *dendron*, a tree; because in the native woods they are always growing upon the branches of trees, their little roots covering the outside of the bark, or hanging pendant, in order to absorb the exhalations constantly arising from a damp soil and dense underwood. The specific name is given on account of the fragrance of the flowers."

Dendrobium moschatum. Musk scented Dendrobium. *Plant*, Epiphyte. *Stem* upwards of four feet high, pendulous. *Leaves* oblong-linear, blunt, alternate, striate with purple. *Flower-stem* radical, ten or twelve feet long, pendulous, slender, naked and upright, from eight to nine feet, producing on the pendulous part nine to twelve flowers. *Flowers* beautiful, large, measuring when expanded, nearly four inches in diameter. *Sepals* or calyx leaves and *petals* oblong, obtuse, producing rich oranges faintly striped with cream color. *Labellum* or lip, slipper shaped, slightly hairy outside, same color as the sepals and petals, inside richly feathered with dark crimson. *Column* dark crimson.

The flowers are very splendid, and of a very large size, being nearly four inches in diameter when fully expanded. The rich orange color, contrasted with the bright crimson in the inside of the lip, gives a very fine effect, and renders this one of the most desirable

kinds hitherto introduced. It is a native of Pegu, where it was discovered by Dr Wallich, and introduced into this country in 1828. The flowers emit a pleasant musk-like scent, very perceptible towards evening, from which circumstance the specific name is given, we believe by Dr Wallich."

"*Maxillaria Deppei.* Mr Deppe's Maxillaria. Epyphite. *Pseudo bulb*, ovate, angles rounded. *Leaves* oblong-lanceolate, acute, platted or ribbed, usually three arising from the summit of the pseudo-bulb, from eighteen inches to two feet long. *Flower-stem* erect, shorter than the leaves, two-flowered. *Sepals* oblong-lanceolate, green, spotted with purplish red. *Petals* white, smaller than the sepals, somewhat cuculate, spotted and striped inside with crimson. *Labellum* or lip three lobed, curling, bright orange, two side lobes spotted and striped with crimson. *Column* cream colored.

"This fine species is a native of New Spain, where it was discovered by Mr Deppe, in 1828, after whom it has been very properly named." J. B.

ART. VI.—*Osage Orange.* (*Maclura Aurantica.*) Communicated by WILLIAM KENRICK.

THE Osage Orange is a native of Missouri and Arkansas, where it rises in elegant proportion to the height of sixty feet. The tree is deciduous and hardy, as it has endured the rigors of the last seven winters near Boston, and is one of the most ornamental of all our native trees. The leaves are oval, lanceolate, of a beautiful shining green, and bear striking resemblance to those of the orange, and the wood also like that of the orange, is armed with long sharp spines. The trees are diœcious, or some male and some female, therefore requiring more than one tree for the production of fruit; but these however cannot be distinguished when young. The fruit is beautiful, but not eatable; of the size of a large orange, of a golden color, and the trees when laded with the fruit are splendid. The wood produces a fine yellow dye. It is valuable for furniture as it receives the finest polish. It is remarkably tough, strong and elastic, and is therefore called *Bow Wood*, being preferred by the Indians to all other wood for bows. It is also supposed to be the most durable timber in the world, and for ship building is esteemed preferrable to live oak.

Even the leaves so beautiful, may, it appears, be converted to very important use, since according to a memoir lately presented to the French Institute, they are valuable as food for silk-worms.

On the best authority I am assured that the trees of the Osage Orange, when set at the distance of fifteen inches asunder, make the most beautiful as well as the strongest hedge fence in the world, through which neither men nor animals can pass.

Newton, April 18, 1836.

Art. VII.—*Remarks on the Culture of Hardy Deciduous and Evergreen Shrubs.*

[From Paxton's Magazine of Botany.]

The culture of hardy shrubs is in general simple and easy, the chief things to be noticed are — the proper season of planting — the situation in which the plants will thrive — the kind of soil best suited to their growth — and the encouragement given to enable them to thrive afterwards.

The proper season for planting.—As soon as the leaves begin to fall in October, deciduous trees may be planted with safety; and although this planting continues until the trees begin to swell their buds again in the spring, yet those plants have invariably succeeded best with us which were shifted in October, November, February, and March and those the worst that were planted in December, January, and April.

Evergreens, in general, if taken up carefully, may be planted with success any season of the year, provided dull or dripping weather be taken advantage of for that purpose. There are particular seasons, however, when they will thrive with much greater freedom than at others. If the situation be dry, and the soil light and sandy, they should be planted (with the exception of hollies) in November and December, if the weather be mild; on the other hand, if the situation be low and the soil retentive of moisture, they should be planted in May. In both cases it is indispensable that all large trees and shrnbs be removed with good balls, and that the roots be uninjured. Hollies should be removed from the end of May to the and of June.

In planting evergreens, I perfectly agree with Mr M'Nab, that

whether it be done in a dull day, a wet day, or a dry day, it is very necessary to keep in view the expediency of keeping the plants for as short a time out of the grouud as possible — if only a few minutes, so much the better; and in all cases, when it can be done, when great numbers are to be planted, we should, if possible, have some men stationed to take up the plants, others to carry them, and a third set to put them in the ground.

"In all seasons, situations, and soils the plants should be well soaked with water as soon as the earth is put about the roots. Where the water is not at hand, so that may not be easily carried or wheeled by men, a horse with a water-barrel on wheels should be used. As soon as the plant has been put into its place the earth should be filled in, leaving a sufficient hollow round the stem, and as far as the roots extend, to hold water, which should then be poured on in sufficient quantity to soak the ground down to the lowest part of the roots; in short, the whole should be made like a kind of puddle."

"By this practice, which is particularly necessary in spring and autumn planting, the earth is carried down by the water, and every crevice among the roots is filled. Care must always be taken to have as much earth above the roots of the plants as will prevent them from being exposed when the water has subsided. The best plan is to take an old birch broom, or anything similar, and laying it down near the root, pour the water upon it; this breaks the fall of the water, and prevents the roots from being washed bare of such earth as may adhere to them: in this way time is saved, for the water may be poured out in a full stream from the pail, a watering-pot, or even from a spout or pipe in the water-cart or barrel, when the situation is such that this can be brought up to the plant."

"After the first watering has dried up, the earth should be levelled round the stem of the plant, and, as far out as the water has been put on, but not trod; if the plants are large a second watering is sometimes necessary, but in ordinary sized plants one watering is quite sufficient; and after remaining twentyfour hours, more or less, according to the nature of the soil, the earth about the stem and over the roots, should be trod as firm as possible, and, after treading should be dressed with a rake."

2. "*The situations in which the plants will thrive.*—With regard to the situation in which each shrub should be planted little can be said here; to form a correct judgment of this, a knowledge of the natural

habitats of each is required ; this knowledge may be easily obtained by referring to a botanical catalogue, and other works treating on the subject. Some shrubs love a dry and elevated situation, and will not thrive crowded with others, — some are rather tender, and must have warm and sheltered places, — others are very hardy, and will thrive planted anywhere, others again will not grow freely unless they are placed in low damp ground, — and others do not flourish if much exposed to the rays of the sun.

3. " *The kind of soil best suited for them.*—With respect to soil, hardy shrubs may be divided into two kinds, viz. first, shrubs requiring common soil; and second, those shrubs constituting the American garden. A rich, light hazel loam undoubtedly suits the greater part of the first class of plants, although many of the stronger growing kinds will make fine bushes on almost any kind of soil. The American plants, as *Kalmias*, *Rhododendrons*, *Andromedas*, &c. &c., make the finest plants and the best show if they are planted in a soil composed for the most part of sandy peat; but in the absence of this, a very good compost may be made for them of light hazelly loam, river sand, and vegetable or leaf mould, equal parts, or a little peat earth mixed with it. After having taken out the original soil from the proposed border to about a foot and a half deep, substitute the above mixture in its place.

4. " *To encourage the growth of the Shrubs after being planted.*— Whilst the plants are small, constantly keep down all rank growing weeds, and clear off all rubbish that would otherwise retard their growth ; also they receive much benefit by the surface of the ground being often stirred with a Dutch hoe, as it prevents the surface baking hard in dry weather.

Watering shrubs, except in peculiar situations, during dry summers, appears to be of very little, if any, benefit; on the other hand, it takes up much time, and is the means of the ground baking hard when dried by the sun again. When they have advanced to a large size all the care required is to cut off the overhanging branches, so as not to allow them to smother each other, or the stems of those overhung will become naked and unsightly.

(From the Baltimore Farmer.)

THE GREVILLE ROSE.—This superbly beautiful rose, notwithstanding fifty plants of it were sold in Baltimore, for five dollars each, in the year 1828, is not so generally known as it ought and deserves to be. I have had one to bloom for several years, and last year it had fifty five branches of flowers, and made about 300 feet of wood, and in my opinion, fully realizing the high character given of it in the fourth number of Loudon's Magazine, page 467, and in the report of the Horticultural Society of London, for the month of June, 1836, which I have extracted for more general information.

Rosa Grevillii, or Greville Rose.—This species has attracted much notice in different parts of Europe and in this country, being quite a novelty in its general characteristics, and in commenting upon which I cannot perhaps give a better idea to the reader than by extracting the statements made in other publications. In the fourth number of Loudon's Magazine, page 467, is the following description given, in a letter from a correspondent to the editor :—

"You will no doubt recollect the shoot I showed you of my Greville Rose, which grew 18 feet in a few weeks — it is now in bloom, and is the most singular curiosity of all the rose tribe that has come under my observation; it grows on an east by north aspect, on the gable end of my house, covering above 100 feet square, with more than 100 trusses of bloom. Some of them have more than 50 buds in a cluster, and the whole will average about 30 in a truss, so that the amount of flower buds is little short of 3,000. But the most astonishing curiosity is the variety of colors produced on the buds at first opening; white, light blush, deeper blush, light red, darker red, and purple, all on the same clusters."

In the report of the Horticultural Society of London for the month of June, 1826, the following remrrks are made :

"Rosa Grevillii, in a single fasciculus of flowers, are roses of every shade of purple, and from white to the darkest tint; it is one of the handsomest of climbing roses."

The leaves are beautifully serrated on the edges, and those on the young shoots have a pink border running entirely round the leaf, and which, contrasted with the green, gives them a delicate and beautiful appearance; the petiole or leaf-stalk is broad at the base, and deeply indented on the sides, so as to form narrow hair-like segments: the upper part where it joins the leaf is narrow and of the usual size. I

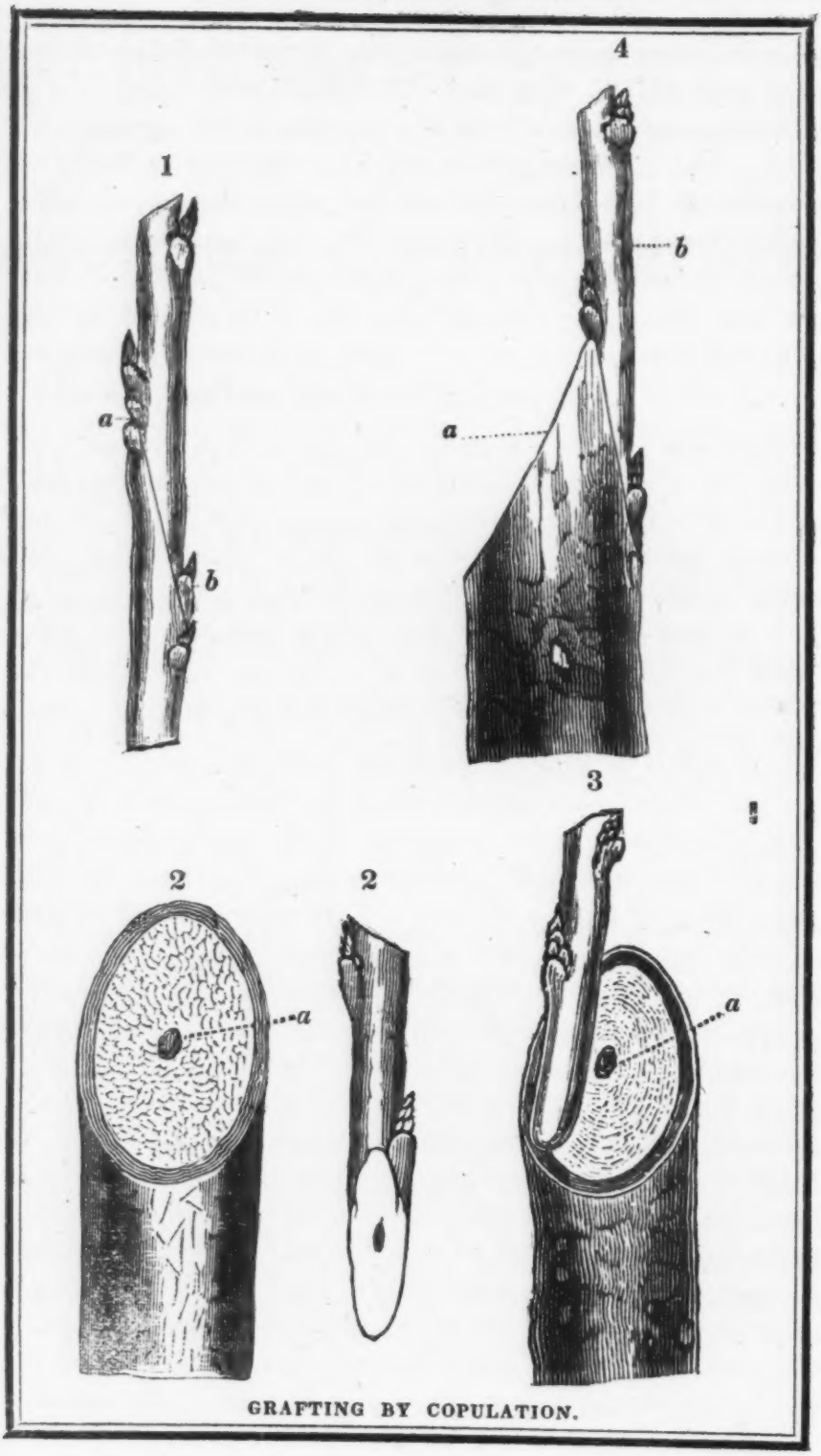
have succeeded during the past season in rearing about 150 young, vigorous plants, two-thirds of which have been already disseminated throughout the Union, and near 500 more are in a progressive state, and will be fit for transplanting the ensuing season."

The undersigned having become fully satisfied of the utility and beauty of this rose, and encouraged by the numerous orders coming in for it, has been induced to propagate it largely, and to lower the price to $1 or $1 50 in large pots, by which means they can be removed at any season of the year. ROBERT SINCLAR.

Clairmont Nursery, Jan. 9.

TO COOK CAULIFLOWERS.—Cut it when close and white, and of a middling size; cut the stem so as to separate the flower from the leaves below it. Let it lie in salt and water awhile; then put it into boiling water, with a handful of salt. Keep the boiler uncovered, and skim the water well. A small flower will require about fifteen minutes boiling — a large one about twenty. Take it up as soon as a fork will easily enter the stem: a little longer boiling will spoil it. Serve it up with gravy or melted butter.—*Gen. Far.*

ELDER TREE.—Sir J. E. Smith has remarked that this tree is, as it were a whole magazine of physic to rustic practitioners. It is said that if sheep that have the rot can get at the bark and young shoots of elder they will soon cure themselves. The wine made from elder berries is too well known by families in the country to need any encomiums; it is the only wine a cottager can procure, and when well made, it is a most excellent and wholesome drink, taken warm before going to bed. It causes gentle perspiration, and is a mild opiate. If a rich syrup be made from ripe elder berries, and a few bitter almonds, when added to brandy, it has all the flavor of the best cherry brandy. The white elder berries, when ripe, make wine much resembling grape wine. The buds and the young tender shoots are geatly admired as pickle. The leaves of the elder tree are often put into the subterranean paths of moles, to drive those noxious little animals from the garden. If fruit trees, flowering shrubs, corn or other vegetables, be whipped with the green leaves of the elder branches, it is said insects will not attach themselves to them. An infusion of these leaves in water is good to sprinkle over rose-buds, and other flowers subject to blight, and the devastations of caterpillars.—*Leigh Hunt's London Journal.*



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